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**Sickness absence according to diagnoses
among employees in food industry from
2003 to 2008**

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Master's Thesis

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May, 2013

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List of Abbreviations used

RCGP: the Royal College of General Practitioners is the professional body for general (medical) practitioners (GPs/Family Physicians/Primary Care Physicians) in the United Kingdom

GI: gastrointestinal

MSD: musculoskeletal disorders

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Abovyan Mara: Sickness absence due to diagnoses among employees in food industry from 2003 to 2008

Key Words: sickness absence, occupational diseases, risk factors, occupational exposure, work ability, aging workers, blue collar, white collar, gastrointestinal diseases, depression, flu, musculoskeletal diseases, pregnancy, injury, accident

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May, 2013

ABSTRACT

Background: Previous studies have indicated locality differences of sickness absence in the context of health and social conditions of inhabitants.

Aim: To examine the number of days of sickness absence among blue- and white-collar workers according to the diagnoses in four factories of a food industry in Finland during a 6-year period (2003-2008).

Methods: The study was carried out at the main four food factories of a large food industry in Finland. The data was collected in a 6-year period from 1 January 2003 to 31 December 2008 from the personnel register of the company. The data included age, gender, occupational status, target units, sickness absence of all members of staff due to diagnoses, and person years of work. The study participants were represented by blue (88.3%) and white collar workers (11.7%). The age structure of the study was from 17 to 69, the mean age by 2006 was 36.8 with range equal to 13.1. Descriptive analyses were done by using frequency tables. The number of sickness absence days per person years among blue and white collar workers was calculated separately for each factory due to diagnoses. Differences in sickness absence for each diagnosis in different factories

among blue and collar workers were evaluated with rate ratio and 95% CI from general linear models, presuming negative binominal distribution for the days.

Results: There were significant differences in number of sick leave days due to diagnoses in the studied target units. The highest rate of sickness absence days according to diagnoses was among blue (127.3) and white (53.5) collar workers at one of the factories. Also, the highest incidence rate of diseases was noted in blue (RR=2.16, 95%CI 1.04-4.50) and white (RR=2.73, 95%CI1.86-4.00) collar workers of the same factory. Musculoskeletal diseases were the most common reason for sick leave, followed by injury or accident for blue and flu for white collar workers.

Conclusion: The study showed that there are differences in number of sick absence days due to diagnoses between four food factories belonging to the same company.

1. INTRODUCTION

Sickness absence is a main problem as it leads to loss of economic productivity, social insurance costs, and direct medical costs of long-term disability. It is supposed to be more a socioeconomic and political issue than a medical or public health problem (Henderson, Glozier & Holland Elliott 2005). Men and women with more than 15 days of sick leave per year are at increased risk of early retirement due to medical reasons and have a higher risk of mortality (Kivimäki et al. 2007; Kivimäki et al. 2004; Vahtera, Pentti & Kivimäki 2004; Kivimäki et al. 2003).

Results from the British Whitehall II cohort and the French GAZEL cohort indicated high mortality rates among the working population who reported absence as a result of following diseases such as mental disorders, respiratory diseases and circulatory diseases (Anema, van der Beek 2008; Head et al. 2008).

Hence, sickness absence is now considered to be a major public health problem, and in European countries a high preference has been given to the research on sickness absence (Ferrie et al. 2009; Whitaker 2001).

Rules in the welfare system, economic situation such as unemployment and decline in economy, social and work environmental conditions, and individual behavior are some main determining factors in the etiology of sick leave (Gimeno et al. 2004).

There are divers points of views related to the sickness absence status as a measure of health in general. In accordance with one of the viewpoints, sickness absence indicates the health of employees in terms of social and physical functioning (Voss, Floderus & Diderichsen 2001). Statistics is often collected at work places, and it diminishes the real picture of the health of the working population as it is based on self- evaluation (Folger, Belew 1985). On the other hand, data on longer spells of absence comes from the results of medical examinations; therefore, it is more exact as a health indicator.

Another point of view is that workers can have sickness absence without being sick in real, or being sick but do not take sick leave. There are several reasons for it: use of sick leave to help family or reduce stress and prevent illness, and take advantage of sick pay schemes (Marmot et al. 1995; Prins, de Graaf 1986; Rael et al. 1995).

Statistics from Finnish municipal employees shows that that there is an association between mortality and sickness absences certified medically (Kristensen 1991).

Moreover, the Whitehall II study of British civil servants has found an association between long period of sickness leave and ill health (Vahtera, Pentti & Kivimäki 2004).

2. REVIEW OF LITERATURE

2.1 Sickness absence

Sickness absence is a main measure of workers' overall health status (Marmot et al. 1995).

It has increased for the last 20 years (Noordik et al. 2009). Work related risk factors such as work arrangement, physical and psychosocial working conditions are major risk factors for sick absence (Kivimäki et al. 2003). Structural factors of working conditions such as overtime work or work shift clarify how the work is organized and arranged (Dionne, Dostie 2007).

The group of physical working conditions includes heavy physical work, ergonomic conditions, and revelation to dangerous substances, e.g., any liquid, gas or solid, which are dangerous to employee's health and safeness (Allebeck, Mastekaasa 2004).

For the last years most attention has been given to psychosocial working conditions as one of the important risk factors for sickness absence. Whereas in former studies the researchers focused mostly on job satisfaction (Hackett 1989); lately the others have explored one of the psychosocial factors such as job strain (Lund et al. 2006), which is a possible risk factor for sickness absence.

There are often differences between long- and short-term sickness absences. It is recognized that subjective factors have less role in long-term absence than in short-term absence. People with short-term sick leaves might be viewed as a coping mechanism that prevent severe disease in the prolonged period rather than as stating poor health (Darr, Johns 2008).

Both political and scientific attentions to sickness absence have increased for the last years in many countries of Europe. Registered sickness absence has been higher in the Netherlands than in other European countries. It turned into the concern on a governmental level, and as a result, leads to the privatization of the sickness insurance and an increase in workplace-oriented preventive actions. Also, in Denmark, there has been a growing emphasis on a reduction of sickness absence; and studies have been done with the focus on work conditions. The Danish government set off the plan named "Sickness Absence – a Shared Challenge" and has an ambition to decrease sickness absence by 20% by 2015. Moreover, in one of the recent reports of

the Organization for Economic Cooperation and Development (OECD) was pointed out ‘‘there is now an urgent need to address the medicalization of the labor market problems’’ (Johansen et al. 2009).

2.2 Risk factors for sickness absence

Different types of physical work environment disclosures such as uncomfortable work postures, monotonous, limited movements and high physical requirements have been associated with sickness absence (Pålsson et al. 1998).

Working conditions such as psychically demanding jobs or repetitive movements increase the possibility of sickness. In the 1980s, Karasek and Theorell (Voss, Floderus & Diderichsen 2001) proposed that a combination of job demands and job control had substantial effects; also the combination of high job demands and low control had associations with e.g. coronary and musculoskeletal diseases. However, only some studies related to sickness absence proved the job demands-job control model, while most of studies found certain effect of low job control or low job demands on sickness absence.

Studies had been carried out to analyze the impact of psychosocial work environment factors on sickness absence. For example, Blank and Diderichsen (1995) found that high psychological (for female) and physical demand at working environment, also the combination of demand and control had an association with frequent short and long periods of sickness absence.

Moreover, Smulders and Nijhuis (Janssen et al. 2003) discovered that age, wellbeing and prior absence had more impact than job control, job demand or physical environmental factors at work. Added to this, researchers found that psychosocial work environment exposures linked to high needs, lack of job satisfaction and management were associated with sickness absence (Voss, Floderus & Diderichsen 2001; Lund, Iversen & Poulsen 2001; Grossi et al. 1999; Hemingway et al. 1997; North et al. 1996).

2.2.1 Individual factors

Standard demographic variables such as gender, age and residence place are often remarked as main determinants of sick leave. In the study carried out by Thomson (Thomson, Griffiths & Davison 2000), age has been clarified as a strong forecaster; moreover, longer employment has been linked to lower sickness leave. Younger employees take sick leave more often, yet their lengths of sickness absence are shorter than older workers' (Blank, Diderichsen 1995).

Another study in the Swedish Ministry of Finance ("The Swedish Illness") tried to calculate how much raise in sickness leave in Sweden in few years can be ascribed to age structure changes, for instance, to the increase in the median age of employees. The change in age justified a bit more of 5% of the growth (Allebeck, Mastekaasa 2004).

A few studies were related to gender differences as another cause for sickness absence. One of them examined the level to which sick leave among female employees was dependent on having children at home (Alavinia et al. 2009). The study in the Ostergotland Country Council found small differences in the numbers of both genders having sickness absence over 7 days if they did not have children. The higher percentage of sick leave among females could be connected to pregnancy-related diseases. The data from the Norwegian National Social Insurance Board (Mastekaasa 2000) showed that having children did not have a main impact on sick leave among men and women. On the other hand, Mastekaasa discovered that a higher rate of respiratory system diseases was among married people who had children. Moreover, a higher incidence of sick leave was among unmarried women with children but not among single previously married women that had children as well.

Based on the study of 9598 workers in the USA, Vistnes (1997) analyzed differences in sick leave among men and women, and found that having children increased the likelihood of absence in females but not in males; though, longer sick leave was among men with children than among those without children.

Results of a study carried out in Sweden showed that long-term sickness absence rate was high among women with children under 10 years old, but in contrast to an American study, it did not find the same among men (Akerlind et al. 1996). Another study done in Denmark found a lower

rate of sickness absence among unmarried women than among women with children; and on the contrary to the Swedish study, short-term absence was higher among them than long-term absence (Frost et al. 1995).

Related to the association between sickness absence and marital status (Isacsson et al. 1992), it was discovered that there was less absence among married people than among unmarried (never married), divorced/separated and widows/widower. In findings by Rael et al. (1995), the higher rate of sick leave was among divorced men but less among divorced women and widows. In contrast, Vistnes discovered that there was no association between high rate of sickness absence and being separated, divorced, and widowed, but there was still low sick leave among married men (Vistnes 1997).

The studies carried out by Hallberg, Mattsson (1992) and Eriksen, Natvig and Bruusgaard (1999) illustrated an association between changes in marital status and sickness absence. The findings by Leigh (1986) showed a high rate of sick leave among divorced persons in the past years and even much higher among widows/widowers; yet Bratberg (Bratberg, Dahl & Risa 2002) did not take separately these two categories of marital status, but he came to the conclusion that high sickness absence was among people who had experienced either divorce or death of a spouse.

2.2.1.1 Work ability

The conception of perceived work ability is viewed as the result of personal resources and work demands. Basically, it is the one of the major components of sickness absence (Breslin et al. 2006). Work drive, performance and employee approach, behavior are entirely reflected by the concept of job performance; while work ability includes a relationship between employee's productive capacity and individual features, and work (its demands, atmosphere and structure) (Pohjonen 2001).

Musculoskeletal disorders are the main reason of both short- and long-term ill health among the working population. According to the latest medical recommendations, it is strongly

recommended for the patients with low-back, neck pain and osteoarthritis to stay active and avoid bed regime, which will prevent further disability (Viikari-Juntura et al. 2012).

Workers with musculoskeletal disorders, who are trying to get medical advice at occupational health services, consider themselves more often partly to be able to work than unable to work (Viikari-Juntura et al. 2012).

2.2.1.2 Aging and sickness absence

Lately, relationship between worker's age and job factors has become the subject of high interest due to the fact of the increasing number of ageing employees. It is noted that there is an association only between age and physical ability or dominance of diseases. Though, a decline in physiological functions due to ageing may have impact on work ability only if job performance mainly depends on such functions. Thereby, age-related decline in work ability has been found to be higher in physically demanding blue-collar jobs than in mentally demanding occupations (Love et al. 2012).

Also, the prevalence of sickness absence and the figures of absences per person are the highest among young workers; it has tendency to fall with increasing age. Short-term sickness absences are more frequent among younger, while long-term sickness absences are more common among older workers (Pohjonen 2001).

2.2.1.3 Gender issue of sickness absence

A great number of health statistics demonstrates that the mortality rate of females is higher than males. There is also a gender difference in sick leave according to diseases. Such differences between genders are explained by that women are more exposed to both paid work and family duties than men. The double burden may include role of overwork as well as role of conflict (Voss, Floderus & Diderichsen 2001).

In most European countries females have higher rate of sick leave days than males. Though, the gender interval is larger for short absence periods and inclines to smaller with long-term periods of sickness absence. Findings from other countries have equally demonstrated that females have more sick leave days of all lengths, though the women excess differs slightly between studies (Mastekaasa 2000).

For example, a study carried out in France showed that women had twice as high risk in medically confirmed sickness absence spells of all lengths than males (Melchior et al. 2003). Finding from a Norwegian study showed that women had the prevalence of medium length of sickness absence spells (Mastekaasa, Dale-Olsen 2000).

One possible cause for the differences in sick leave between genders is working conditions. Due to the fact that labor market is separated into male and female occupations, work duties and environment may vary significantly between genders, and the differences in sickness absence between them might be a result of differences in types of work performed by males and females. Women often occupy lower white-collar positions, whereas men are often in upper white-collar positions, besides managerial and blue-collar positions. There are not only gender differences in hold occupations, but also women and men are not equally distributed across occupations (Laaksonen et al. 2010).

Besides, different aspects related to home and personal life have been proposed to describe women's excess in sickness absence. Female often carry the main duty of family, which lead to an increase in their work load, might cause difficulties in handling work and family life at the same time, and it can also result in physical and psychological health problems. Moreover, stressful situations in personal life such as divorce, financial difficulties or serious illness of family members had stronger association with sickness absence in females than in males (Laaksonen et al. 2008).

Also, the women excess in sick leave might be defined by following factors. First of all, sickness absence is a sign of health issue. Self-stated symptoms and visits to the general practitioner indicate that women may have more ill health than men. Moreover, women may identify symptoms of disease better and be more active at looking for professional help than males (Laaksonen et al. 2010a).

2.2.1.4 Occupational status and sickness absence

High rates of sick leave have always been among the population with low socioeconomic status (Laaksonen et al. 2008). Blue collar workers are likely to have two to three times more rate of sickness absence than white collar workers (Laaksonen et al. 2010b; Virtanen et al. 2011). Therefore, comprehending the reasons for the social gradient in sickness absence might give a chance to decrease episodes of sickness absence. Explanations of the social gradient have mostly been based on the effect of health-related behaviors, health and working conditions, such as physical and psychosocial (Love et al. 2012).

Lately, Christensen et al (2008) and Laaksonen et al (2010b) discovered that physical working conditions were the strongest factors in explanation for the different rates of sickness absence between occupational classes (blue and white collars). In contrast, both the effect of health-related behavior and psychosocial work (Christensen et al. 2008; Hansen, Ingebrigtsen 2008; Trine et al. 2010) were dramatically less. Moreover, it was noted that the association between socioeconomic status and sickness absence may differ by period and rate of sickness absence (Trine et al. 2010). The study carried out by Virtanen et al (2011) shows that the association might be diagnose-specific.

Moreover, white collars have less sickness absence days than blue collars, but they both take sick leave more often and for a longer period (Love et al. 2012).

2.2.2 Environmental risk factors of sickness absence

The others tried to explain gender differences taking into the consideration workplace conditions and whole workload in both home and work. In the research for all Ostergotland Country council, Alexanderson et al. (1994) discovered that sick leave, especially among women, was higher in workplaces with male prevalence, while sickness absence in both genders was lower in workplaces with more equal number of males and females. By comparing the present of both genders in the same job and in the same work environment, Mastekaasa, Dale-Olsen (2000) came

to the conclusion that less healthy workplaces could not explain the higher sick leave among women.

Moreover, official data presents significant information on differences in regard to the place of residence. Sickness absence depends not only on the labor market condition, but it differs with the labor market among countries and territories. For instance, studies carried out in Sweden (Allebeck, Mastekaasa 2004) illustrated high incidence of sickness absence as well as disability pension in rural areas.

Also, the results of the study (Virtanen, Vahtera & Nygård 2010), carried out in four food target units of the same food company, showed the significance of locality as an independent defying factor of sickness absence. Moreover, the same study pointed out that employees' health, environmental and ergonomic risk factors, also psychosocial features of the job were monitored, yet approximately 66% of locality differences in short-term sickness absence and over 90% of locality differences in long-term sickness absence stayed indefinable. The explanation of results was a demonstration of factory-determined sickness absence cultures.

Added to this, the previous study of localities (Virtanen et al. 2006) explained the locality differences of sickness absence as a fact which is probably based on the features of the communities where the factories and workers are located.

2.2.3 Psychosocial and physical risk factors of sickness absence

Sick leave is affected by different demographic/social factors such as social insurance, marital status, age, gender; industrial factors and government policies. Further, researchers have also explored the impact of psychosocial work environmental factors on both sickness absence and general health. One of the most broadly examined concepts in this field is psychological job strain, conceived in Karasek's demand/control model as a combination of high psychological demand and low decision latitude or lack of control. Several studies have shown that high job strain is one of the risk factors contributing into the variety of chronic health condition such as cardiovascular disease and depression. Furthermore, job strain is linked to longer and more frequent periods of sickness absence as it increases the risk of chronic health conditions. Also,

employees in high strain jobs take longer periods of sick leave to decrease the influence of high job strain and have recovery from work. The other features of work-related factors (e.g., work hours, work shifts and job security) were also linked to sickness absence. However, the limitations of prior studies in this area required further research aimed at examination of probable predictors of sickness absence (Rael et al. 1995).

According to Austrian Labor Force Survey (Figure 1), 60% of total working population in Austria is exposed to one risk factor at their work places. Approximately half of them are confronted to at least one physical risk factor and more than 30% to at least one psychosocial risk factor at their place of work. Men (67.2%) are more exposed to at least one risk factor than women (50.9%). Moreover, 55% of male workers are subjected to at least one physical factor, and the proportion of men (37.9%) exposed to at least on psychosocial risk factor is higher approximately by 8% than women (29.5%) (Vogt M. 2010).

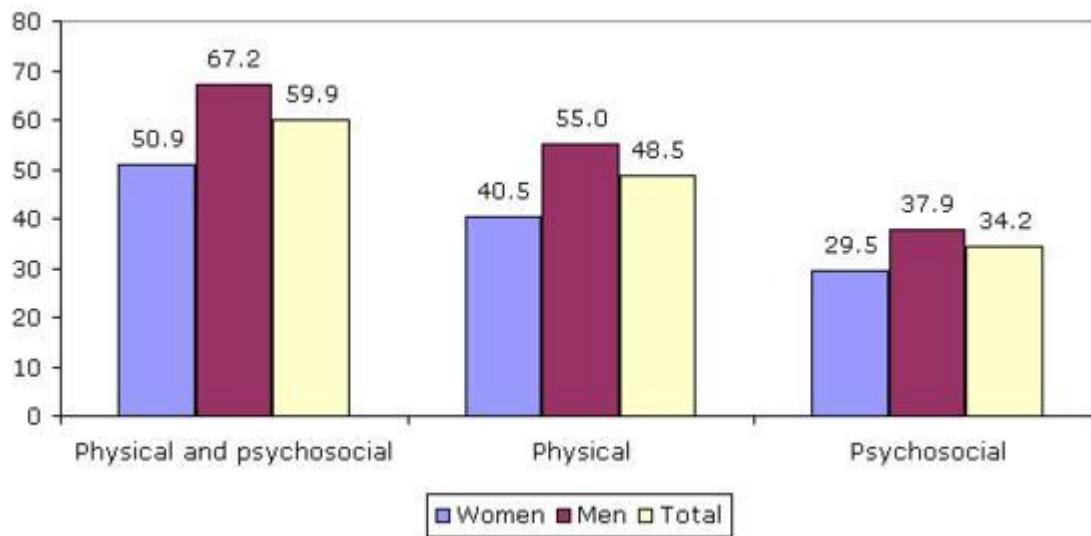


Figure 1: Employees exposed to physical and psychosocial risk factors at work, by gender, % (module of the 2007 Austrian Labor Force Survey)

On the other hand, the previous results of the study (Virtanen et al. 2008) in Finnish municipalities showed that little part of locality differences in sickness absence can be justified by physical and psychosocial conditions at a work place; and reimbursement and certification demands were similar at the work places. Possible variations in the approaches among health staff giving the certificates might be ranked as individual “practitioner habitus”, which as a

matter of fact, has being element and piece of the ‘ worker habitus’ at the community level in relation to sickness absence (Virtanen, Vahtera & Nygård 2010).

2.3 Sickness absence due to diseases

Sickness absence is different among diverse groups of population. The middle of the 1980s was the time of economic development, low unemployment rate and higher sickness insurance benefits: in Sweden there was an increase in sickness absence rate approximately from 18 to 25 sick-leave days/per insured person in 1983 and 1988 respectively. Later, at the beginning of the 1990s, Sweden faced to slow economic growth, unemployment rate was higher than it had been many years ago, but the financial compensation for sickness absence was decreased. In 1994 sick leave rate dropped off to about 14 days/person. On the other hand, the sick leave rate started to increase in the last half of the 1990s and at the beginning of 2000. Consequently, unemployment rate fall down (Alexanderson & Norlund 2004).

During several years, the most common reasons for long-term sickness absence have been musculoskeletal, psychiatric and cardiovascular diseases, which have been followed by injuries and poisoning/intoxication. Diseases related to the musculoskeletal system have a dominant place; however there has been an increase in the rate of psychiatric disorders for the last years. Upper airway infections present the main category of reasons for short-term sickness absence. Musculoskeletal diseases among men and women on long-term sick leave decreased from 1990 to 1999, from 38% to 35%, and from 41%to 39%, respectively. During the same period, there was an increase in the rates of psychiatric disorders among both sexes, from 16% to 17% in males, and from 13% to 18% in females. Sickness absence due to cardiovascular diseases was steady during those years (Alexanderson & Norlund 2004).

2.3.1. Gastrointestinal diseases

Diseases of the esophagus, stomach, duodenum, jejunum, ileum, large intestine, sigmoid colon, and rectum are included into the group of gastrointestinal (GI) diseases. Infections, unhealthy life style, stress, travelling over time zones, side effects of the medicines are the main causes of GI

diseases. Moreover, lower socioeconomic classes have the high possibility of getting a peptic ulcer and stomach or colon cancer (Magee et al. 2011). The incidence rate of peptic ulcer is different in various studies. The latest study carried out by Aro et al. (2006) illustrated the frequency of peptic ulcer in northern Sweden was equivalent to 4.1% (20 gastric and 21 duodenal ulcers); while the American study found that the prevalence of self-reported peptic ulcer was 52.7 per 10000 people (gastric 17.0, duodenal 6.1, and unspecified 30.4 per 10000) (Everhart, Bryd-Holt & Sonnenberg 1998). There was an increase in a rate of GI diseases during the 19th century; it achieved a peak during the first half of the 20th century, then it started declining.

Also, some studies have found that other environmental factors might be possible factors for cancers of the gastrointestinal tract. There is an association between peritoneal mesothelioma and both occupational and environmental disclosure to asbestos. A French cohort study found high incidence rate of GI cancer such as mesothelioma, esophageal and small intestine cancers among individuals that were exposed to occupational asbestos (Knutsson, Boggild 2010).

Moreover, a study carried out by Kjærheim et al. (2005) found that there was a high risk of stomach cancer among employees exposed to asbestos in drinking water.

In publications from 1950s and afterwards, it was shown that peptic ulcer was more frequent among shift workers. Thiis-Evensen (Knutsson, Boggild 2010) identified it as ‘‘the occupational disease of shift workers’’. Shift work is widespread in developed countries. For example, in the USA, almost 15% of working population have full time job with evening, night, rotating, split, or employer- arranged irregular schedules (Caruso, Lusk & Gillespie 2004). The increased risk of poor health, illnesses, accidents and errors are negative consequences of these work shifts (Steel, Schmidt & Shultz 2008). Gastrointestinal (GI) disorders are one of the most common complains among shift employees. According to Vener’s opinion (Parkes 1999), shift work effects on functions of gastrointestinal system such as motility, enzyme availability, and acid base balance in the digestive system.

2.3.2 Depression

30-50% of people in developed countries suffer from mental disorders during their lifetime (Kessler et al. 2007).

These disorders are common among the working population, and they are one of the main reasons of impaired functioning (Druss et al. 2008), decline in productivity (Wang et al. 2004), and premature death (Mykletun et al. 2007). The dominance of mental health complains are quite high in high-income countries, and they are one of the main causes of certified sickness absence. Psychological disorders are associated with long-term sickness absence and long-lasting work disability (Lexis et al. 2012). For example, in the Netherlands, mental health complains had the highest number (19%) of total sick leave days in 2009. Also, latest studies showed that a great part of the mental health complains among labor force were presented by depressive complains (Harvey et al. 2009; Andrea et al. 2004).

Moreover, it was found a strong association not only between long-lasting sickness absence and major depression but also milder form of depression (Hjarsbech et al. 2011; Lexis et al. 2009).

2.3.3 Flu

Influenza is a highly transmissible disease that affects the total population of all ages. It has socio-economic effects, and approximately 10-20% of all sick leaves from work are due to flu. Statistics related to the impact of influenza on work are limited (Knutsson, Boggild 2010).

The researches aimed at studying the effects of flu on communities present some difficulties. Influenza cannot be sufficiently classified on clinical bases from respiratory infections caused by other groups of microorganisms (de Blasio et al. 2012); and also, somewhat the disease may lead to the secondary infection or impairing of the main chronic illness (O'Reilly, Stevens 2002). Comparisons are difficult as studies use varieties of clinical definition. Moreover, by quality of low sensitivity, laboratory analysis may undervalue manifestation of infection. The whole sickness absence may take over other respiratory diseases. Flu may cause typical symptoms in no

more than 50% of cases; 30% of cases are presented by upper respiratory tract symptoms without fever, whereas 20% have asymptomatic manifestation (de Blasio et al. 2012).

The overall burden of flu keeps on a high level (Leighton et al. 1996). Cases of influenza occur periodically in forms of epidemics or pandemics (O'Reilly, Stevens 2002). The most severe epidemic in 1918 was the cause of 100,000 deaths. The mild outbreak of influenza in 1989 was responsible for about 25,000 additional deaths in England and Wales (Leighton et al. 1996).

Outbreak of seasonal influenza ('influenza epidemic') usually takes place yearly during the late autumn and winter. Approximately 5-20% of population gets influenza each year, while up to 30% are exposed by pandemic flu ((Tora-Rocamora et al. 2012). The RCGP meeting on influenza stated concern that flu could take thousand lives per year; it was the reason of losing more working days per year than musculoskeletal disorders. Influenza remains a significant cause of sickness and occasional death (Leighton et al. 1996).

2.3.4 Musculoskeletal diseases

Musculoskeletal disorders (MSD) are widespread, and their impact is significant. They are the most frequent cause of severe long-lasting pain and physical disability. Moreover, they have significant influence on affected people's and their families' psychosocial status (Tora-Rocamora et al. 2012). Statistics from countries with different health and welfare facility show that there is an association between epidemic of disability and back pain. The most common reason of disability among labors is back pain (Woolf, Pfleger 2003). The etiology of back pain is not well-known yet. The most researches focused on physical risk factors in physically demanding occupations; however the findings showed that only 20% of back pain was the result of physical exposures (Hemingway et al. 1997).

The most of people with back pain do not have pathological injury; and the results of magnetic resonance tomography have not shown any anatomical differences between individuals with and without back pain. Moreover, few studies were done to examine back pain in sedentary office

jobs. However, there is controversy evidence about that long lasting sitting position is associated with back pain (Hemingway et al. 1997).

Also, present studies, which used socioeconomic status as a measurement for occupational physical exposure, noted great differences between manual and non-manual labor jobs.

Psychosocial work features, which are significantly associated with socioeconomic status, have been assumed as an intercessor between health and socioeconomic status.

The research carried out among 3020 aircraft workers during 3 years showed that employees who “hardly ever” liked their job were 2.5 times more probably to state a back injury than the others who continuously enjoyed their jobs (Hemingway et al. 1997).

It is calculated that 70% of adult population in the western countries have pain symptoms in the arm at some period of their life. Nowadays, the most of occupational illnesses are represented by musculoskeletal disorders; and arm pain is on the second place after back pain as a reason of work-related illnesses (Hemingway et al. 1997). Mainly, incidence rates are higher among blue collar workers than among white collars workers with rates differing due to certain occupations. For example, half of computer workers in the United States feel musculoskeletal arm pain (Tornqvist et al. 2009).

Both high occupation-specific illnesses and socio-economic diversity may be the reason of high frequency rate of sickness absence in particular jobs. Yet, it is known insufficiently about the effect of pain from different body parts, psychosocial work conditions and individual factors on absence from work due to MSD (Morken et al. 2003).

Latest studies aimed at the correlations of sick leave with spinal pain have analyzed pain in low back or neck separately. Though, pain both in low back and neck may cause more disability than pain in one location. Earlier prospective study found that having pain in both locations had stronger association with sickness absence than pain in either location only (Kaaria et al. 2012).

The follow-up study (1998-2000) carried out among workers in the aluminum industry in Norway found that blue collar workers had higher incident rate of sickness absence from MSD than white collar workers. The main reasons of sick leave due to MSD were both widespread pain

and low back pain. Insufficient social aim prognosticated absence from work among workers with MSD during the period of 1-12days. Moreover, the study noted that individual risk factor such as age, gender; smoking and physical activity played the minor role in prediction of sickness absence from MSD among industrial workers (Fernandez-de-las-Penas et al. 2012).

2.3.5 Pregnancy related sickness absence

A large proportion of women of reproductive age have entered the whole work force in Europe (Kristensen et al. 2008). Pregnant women are exposed to environmental conditions at their work regarding to both health and their own function as well as a result of pregnancy. Nevertheless, work places are not adjusted to the pregnant women's need; as a result, high incidence rate of pregnancy-related sickness absence was stated in few studies. Results in the studies related to pregnant female workers have been different in sick leave due to work conditions, in work shifts and managerial factors as well as physical work load (Morken et al. 2003).

The incident rate of sickness absence from work during pregnancy is high in many western countries of Europe. Some of the Scandinavian studies indicate particular factors of a working environment as a risk factor for sickness absence among female during pregnancy period. The study, which was carried out in Denmark, discovered that main diagnoses for sickness absence among pregnant women in different occupations were nausea, pelvic, back, or abdominal pain(40%). They were followed by other abdominal diseases (23%), severe pregnancy complications (20%), irregular contractions (8%), previous pregnancy complications (6%) and multiparity (3%). The determinants of sickness absence were shift and night work as well as jobs, which involved heavy lifting, work with toxic materials, walking and standing (Kristensen et al. 2008).

Two Norwegian researches discovered that 26% of the pregnant women had sickness absence eight weeks before the normal maternity leave; and half of the pregnant women had it three weeks before normal maternity leave. Stressful work environment, shift work and heavy lifting jobs were defined as exposure factors for sickness absence among pregnant women (Strand, Wergeland & Bjerkedal 1997).

2.3.6 Injury or accident

Injuries are one of the critical public health problems among adolescents and young adults, and occupational injuries are one of the most preventable health-related problems. In total, the attributable fraction of disability-adjusted life years (DALYs) of occupational injuries among female and male workers aged 15-29 years in 2000 was 2.5% and 15.4%, respectively (Concha-Barrientos et al. 2005).

A few studies found that non-fatal work-related injuries had higher rates among young workers than adults (Salminen 2004; Sleet, Ballesteros & Borse 2010); they also suggested the necessity for special provisions to provide security for the employees of the vulnerable group, particularly in the countries with the large number of young workers.

Studies based on self-report, medical records and compensation claims data (Breslin et al. 2003; Jackson 2001) showed that in North America and European countries the frequency of work injury among adolescents (15-18 years old) was twofold higher than among older adults (Breslin, Smith 2005), with the more prevalence among male than female subjects (Breslin et al. 2003; Jackson 2001). However, the findings from the industry-specific studies have found no differences in injury rates between genders (Mardis, Pratt 2003; Mayhew, Quinlan 2002) and proposed that gender differences in work injury among adolescents have a strong association with the type of work.

Moreover, there is an association between demographic characteristics and work-related injury risk factors among young individuals. The rate of work injuries among young male workers is twice more than among young females. Adolescents from low income families more often occupy risky jobs than those from high income families. Particular job characteristics put youth at higher chance for work-related injuries. For example, work injury rates are higher among youth in the occupations such as manual jobs (cleaners, stock handlers), good producing sectors (construction, manufacturing, agriculture) and food services than among young individuals holding sales jobs or administrative/clerical jobs (Kaerlev et al. 2004).

Also, injury hazard is associated occasionally with longer working hours, perhaps because of stress or tiredness (Breslin et al. 2006).

3. AIMS OF THE STUDY

Based on the previous study referring to locality differences of sickness absence, the aim of the study is to examine the number of sickness absence days per person years among blue and white collar workers according to the diagnoses in four factories of a food industry in Finland during a 6-year period (2003-2008).

Our hypothesis states that there is a difference in number of sick leave days for each diagnosis in the different factories.

4. METHODS

4.1. Study design

The study was carried out at the main four food factories of a large food industry concern in Finland. The data was recorded in a 6-year period from 1 January 2003 to 31 December 2008 by the personnel register of the company, including age, gender, occupational status, target units, sickness absence of all members of staff due to diagnoses and person years of work. Classification of diagnoses was done according to the 10th revision of the International Classification of Diseases (ICD-10). The title ‘other illnesses’ was included the rest of diseases, which were not classified in the data as the separate one. Diagnoses, whose names were missing in the personnel register of the company due to unknown reasons, were represented by the variable called ‘missing diagnoses’.

4.2. Study population

The study participants were presented by blue and white collar workers, out of which 326 were white collars (11.7%) and 2454 were blue collars (88.3%), (table 1). Total of 1105 males (39.7%) of which 973 were blue collars (88.1%) and 132 were white collars (11.9%), whereas out of 1675 females (60.3%) were 1481 blue collars (88.4%) and 194 white collars (11.6%), (table 3). The age structure of the study was from 17 to 69, the mean age by 2006 was 36.83 with standard deviation (SD) equal to 13.13 (table 1).

4.3. Statistical analyses

Descriptive analyses were done by using frequency tables. Analysis of two qualitative variables was conducted by cross tabulation.

The number of sickness absence days per person years among blue and white collar workers was calculated separately for each target unit due to classified diagnoses.

Differences in sickness absence for each diagnosis in different factories among blue and collar workers were evaluated with rate ratio and 95% CI from general linear models, presuming negative binominal distribution for the days.

The variable ‘person years of work’ was used as an offset variable in the generalized linear model, and there were also selected the cases that had person years of work >0.5 . The target unit ‘Saarioisten säilyke Huittinen’ (factory A) was chosen as a reference factory: based on the previous study carried out by Virtanen et al. (2008), factory A had the lowest sickness absence level. The model was adjusted by age and gender.

Person years of work: the number of days that each person was at work per year, excluding holidays and sick leaves (converted into a year: the whole year =1).

Total duration of sick leave days: the number of days that each person took sick leave for a 6-year period of the study.

The periods of absence from work for reasons other than diseases were excluded.

5. RESULTS

5.1 General description of the study population

In total, 2780 people worked in the 6 years period 2003-2008. The first table shows that 60.3% of employees were represented by females (1675). The number of blue collar workers (2454) was 7.5 times more than white collar workers (326). The lowest percentage of white collar workers was at the factory C (13.6%), while in the factories A, D and B, it was 17%, 22% and 47.4%, respectively.

Table 1: Descriptive statistics of the studied population

Characteristics	N=2780	%
Gender		
Female	1675	60.3
Male	1105	39.7
Occupational status		
Blue-collar	2454	88.3
White-collar	326	11.7
Factories		
Saarioisten säilyke Huittinen (A)	473	17.0
Ruoka-Saarioinen (B)	1318	47.4
Liha-Saarioinen Jyväskylä (C)	378	13.6
Liha-Saarioinen Valkeakoski (D)	611	22.0

The data presents a total of 1675 females of which 869 (over 50%) worked in the factory B; it was followed by factory D, A and C, with 404(24.1%), 285(17.0%), 118(7.0%),

correspondingly; whereas there were in total 1105 males out of which 449 (40%) worked in the factory B. In contrast to the number of females worked in the factories C and D, the number of males was higher in the factory C by 142, and less by 192 in the factory D (Table 2).

Table 2: Descriptive statistics of the factories by gender

Factories	Male		Female	
	N	%	N	%
Saarioisten säilyke Huittinen(A)	188	17.0	285	17.0
Ruoka-Saarioinen (B)	449	40.6	869	51.9
Liha-Saarioinen Jyväskylä(C)	260	23.5	118	7.0
Liha-Saarioinen Valkeakoski(D)	208	18.8	404	24.1
Total	1105	100	1675	100

Table 3: Occupational status of the studied population by gender

Occupational status	Male		Female	
	N	%	N	%
Blue collar	973	88.1	1481	88.4
White collar	132	11.9	194	11.6
Total	1105	100	1675	100

The factory B had the highest number of blue collar workers (1182). Also, the prevalence of white collar workers was the highest at the factory B (136), whereas the lowest was in the factory C (56), (Table 4).

Table 4: Descriptive statistics of target units by occupational status

Factories	Blue-collar		White-collar	
	N	%	N	%
Saarioisten säilyke Huittinen (A)	412	16.8	61	18.7
Ruoka-Saarioinen Oy(B)	1182	48.2	136	41.7
Liha-Saarioinen Jyväskylä (C)	322	13.1	56	17.2
Liha-Saarioinen Valkeakoski (D)	538	21.9	73	22.4
Total	2454	100	326	100

5.2 Sickness absence due to different disease among blue-collar

Table 5 represents the mean distribution of sick leave days in each factory due to diagnoses in comparison of occupational statuses. It can be seen that the highest mean of absence days was among blue collar workers due to musculoskeletal diseases. The leading factory was factory C, followed by factory D, B and A. Next, the high rate of sickness absence days (with mean over 20) was due to injury or accident in the factory C. Yet, the mean distribution of sick leave days due to depression, burnouts and gastrointestinal diseases was higher in the factories D (7.2; 1.5) and B (6.9; 1.4). The highest rate of sickness absence days due to pregnancy was found in the factory D (4.8), while in the factory C it was about 2.4 times less than in the factories A and B. The values of sickness absence days due to other illnesses and missing diagnosis were the highest in

the factory C (18.8, 6.4 respectively), while the lowest due to missing diagnosis was in the factory A (4.7) and due to other illnesses – in the factory B (13.2).

Table 5: Sickness absence days in each factory according to diagnoses during 6 years

Diagnoses	Factory A (n=473)		Factory B (n=1318)		Factory C (n=378)		Factory D (n=611)	
	Blue collar (n=412)	white collar (n=61)	blue collar (1182)	white collar (n=136)	blue collar (n=322)	white collar (n=56)	blue collar (n=538)	white collar (n=73)
Gastrointestinal diseases	0.2	0.2	1.4	1.0	0.2	0.3	1.5	1.2
Depression, burnout,etc	3.4	0.4	6.9	1.4	4.5	3.3	7.2	4.4
Flu	7.6	2.6	14.9	9.3	14.4	5.4	13.6	7.4
Musculo-skeletal diseases	38.7	6.9	42.1	6.3	58.8	13.0	43.0	5.8
Pregnancy	2.8	0.1	3.0	0.6	1.3	0.0	4.8	5.6
Injury or accident	9.3	3.2	13.4	3.3	22.7	7.4	17.7	4.1
Other illnesses	14.0	3.6	13.2	10.3	18.8	17.7	16.8	7.4
Missing diagnosis	4.7	4.9	5.2	2.9	6.4	6.4	5.5	3.7
Total	80.8	21.8	100.2	35.1	127.3	53.5	110.1	39.8

Factory A: Saarioisten säilyke Huittinen

Factory B: Ruoka-Saarioinen

Factory C: Liha-Saarioinen Jyväskylä

Factory D: Liha-Saarioinen Valkeakoski

5.3 Sickness absence due to different disease among white-collar

Musculoskeletal diseases were the most common reason of sickness absence among white collar workers. The highest rate of sickness absence days due to MSD was in the factory C (13.0), while the lowest was in the factory D (5.8). While injury or accident was the second most common reason of sickness absence among blue collar workers, flu was among white collars. The mean distribution of absence days due to flu was the highest in the factory B (9.3); the lowest was in the factory A (2.6). The rate of absence days due to depression was higher in both factories C and D (over 4.0) than in the factories A and B.

Rate of absence days due to injury or accident was high in the factory C (7.4). The factory D (5.6) had the highest mean of sickness absence days due to pregnancy, while in the factory C there were no cases of sickness absence due to pregnancy. The rate of sickness absence days due to gastrointestinal diseases was higher in both factories B and D (slightly over 1.0). The factory C had the dominant rates of sickness absence days due to other illnesses and missing diagnosis, 17.7 and 6.4 respectively; while the lowest rate of sickness absence days due to missing diagnosis was in the factory B and due to other illnesses – in the factory A.

Overall, the highest rate of sickness absence days due to diagnoses among blue collar workers was in the factory C (127.3), which was followed by the factories D (110.1), B (100.2) and A (80.8); the prevalence rate of sickness absence days among white collars was also high in the factory C (53.5); it was followed by factory D (39.8), B (35.1) and A (21.8).

5.4 Association of sickness absence due to different disease with factories among blue-collar workers

Rate ratio (RR) and 95% Confidence Interval (CI) for each diagnosis were analyzed for different factories in comparison of occupational groups (table 6 and 7). Factories D and B had significantly higher rate of sickness absence due to gastrointestinal diseases (RR=8.39, 95%CI 6.40-11.01) and (RR= 8.12, 95% CI 6.26-10.53), respectively.

The rate of sickness absence due to depression was slightly different among factories: the highest rate was in the factory C (RR=2.49, 95%CI 2.08-2.98).

The occurrence of musculoskeletal diseases was 2.76 times higher in the factory C (95% CI 2.37-3.22). Injury or accident rate was over 2.5 times higher in the factory C (95% CI 2.33-3.21) than in the factory A. The rate ratio (RR) for pregnancy was 1.28 (95%CI 1.05-1.57) in the factory D; in contrast, the results were not statistically significant in the factories B and C.

In comparison with the reference factory A, the incidence rate of flu was approximately 2 times higher in the factories B, C and D.

The factory C had higher rate of other diseases (RR=2.22, 95%CI 1.89-2.59) and missing diagnoses (RR=1.58, 95%CI 1.34-1.86) than the factories B and D.

In total, the highest incidence rate of diseases among blue collars was in the factory C (RR=2.16, 95%CI 1.04-4.50); it was followed by factories B (RR=1.98, 95%CI 1.28-3.07) and D (RR=1.92, 95%CI 1.17-3.14).

Table 6: Rate Ratio (RR) and 95% Confidence Interval (CI) for each diagnosis in different factories among blue collar workers

Diagnoses	Factory A	Factory B		Factory C		Factory D	
		RR (95% CI)		RR (95% CI)		RR (95% CI)	
		Model I	Model II	Model I	Model II	Model I	Model II
Gastrointestinal diseases	1	7.99 (6.17-10.34)	8.12 (6.26-10.53)	1.35 (0.95-1.91)	1.51 (1.06-2.15)	8.28 (0.63-10.85)	8.39 (6.40-11.01)
Depression	1	2.03 (1.78-2.29)	2.24 (1.96-2.55)	1.34 (1.14-1.58)	2.49 (2.08-2.98)	2.11 (1.83-2.44)	2.29 (1.98-2.66)
Flu	1	1.9 (1.74-2.21)	2.06 (1.83-2.33)	1.89 (1.63-2.21)	2.21 (1.89-2.59)	1.79 (1.57-2.06)	1.84 (1.61-2.11)
Musculo-skeletal diseases	1	1.09 (0.97-1.22)	1.72 (1.53-1.95)	1.52 (1.31-1.76)	2.76 (2.37-3.22)	1.11 (0.97-1.26)	1.71 (1.49-1.96)
Pregnancy	1	1.07 (0.91-1.27)	0.82 (0.68-0.98)	0.44 (0.33-0.60)	0.20 (0.15-0.28)	1.69 (1.40-2.03)	1.28 (1.05-1.57)
Injury or accident	1	1.44 (1.28-1.62)	1.79 (1.59-2.03)	2.45 (2.10-2.84)	2.73 (2.33-3.21)	1.89 (1.66-2.27)	2.29 (2.00-2.63)
Other illnesses	1	0.94 (0.84-1.06)	1.21 (1.07-1.37)	1.34 (1.16-1.56)	2.22 (1.89-2.59)	1.19 (1.05-1.37)	1.28 (1.13-1.47)
Missing diagnosis	1	1.11 (0.98-1.26)	1.53 (1.34-1.75)	1.36 (1.16-1.59)	1.58 (1.34-1.86)	1.18 (1.02-1.35)	1.17 (1.01-1.36)
Total	1	1.96 (1.27-3.03)	1.98 (1.28-3.07)	1.88 (0.91-3.88)	2.16 (1.04-4.50)	1.85 (1.13-3.03)	1.92 (1.17-3.14)

Model I: Unadjusted rate ratio (RR)

Model II: Adjusted for age and gender

Table 7: Rate Ratio (RR) and 95% Confidence Interval (CI) for each diagnosis in different factories among white collar workers

Diagnoses	Factory A	Factory B RR (95% CI)		Factory C RR (95% CI)		Factory D RR (95% CI)	
		Model I	Model II	Model I	Model II	Model I	Model II
Gastrointestinal diseases	1	6.28(3.09-12.76)	6.16(3.02-12.56)	1.96(0.83-4.60)	2.29(0.96-5.47)	7.60(3.64-15.88)	7.69(3.65-16.25)
Depression, burnout,etc	1	3.51(2.09-5.92)	3.85(2.25-6.58)	8.39(4.80-14.68)	9.58(5.34-17.19)	11.14(6.52-19.05)	12.47(7.15-21.76)
Flu	1	3.61(2.56-5.09)	3.63(2.56-5.14)	2.10(1.39-3.17)	2.55(1.66-3.91)	2.88(1.97-4.23)	3.04(2.05-4.49)
Musculo-skeletal diseases	1	0.91(0.66-1.26)	1.03(0.74-1.43)	1.87(1.28-2.74)	2.09(1.41-3.09)	0.84(0.58-1.22)	1.39(0.95-2.06)
Pregnancy	1	5.30(1.98-14.20)	1.27(0.36-4.46)	n/a	n/a	49.03(18.37-130.84)	16.64(4.97-55.71)
Injury or accident	1	1.02(0.73-1.45)	0.95(0.67-1.35)	2.29(1.54-3.43)	2.20(1.42-3.41)	1.29(0.88-1.89)	1.25(0.85-1.85)
Other illnesses	1	2.89(2.07-4.04)	2.86(2.04-4.02)	4.96(3.36-7.34)	5.14(3.33-7.94)	2.09(1.44-3.05)	2.85(1.92-4.23)
Missing diagnosis	1	0.58(0.42-0.82)	0.57(0.40-0.80)	1.32(0.88-1.95)	1.12(0.74-1.67)	0.77(0.52-1.18)	0.79(0.53-1.18)
Total	1	1.21(1.40–10.54)	8.34(0.26-265.74)	2.45(1.69-3.55)	2.73(1.86-4.00)	1.37(0.16-11.61)	8.98(0.27-298.73)

Model I: Unadjusted rate ratio (RR)

Model II: Adjusted for age and gender

n/a: Not applicable

5.5 Association of sickness absence due to different disease with factories among blue-collar workers

The pregnancy was the most common reason of sickness absence in the factory D (RR=16.64, 95%CI 4.97-55.71) and also in comparison with the rest diagnoses in the other target units. However, the data related to incidence rate of pregnancy in the factory C is not available, while the results in the factory B were not statistically significant. Depression was the next prevalent reason of sick leave in the factory D (RR=12.47, 95%CI 7.15-21.76). Again, in the factory D there was the highest rate of occurrence of gastrointestinal diseases (RR= 7.69, 95%CI 3.65-16.25), the lowest was in the factory C (RR= 2.29, 95% CI 0.96-5.47). The highest incidence rates of musculoskeletal disease and injury or accident were in the factory C (RR=2.09, 95%CI 1.41-3.09) and (RR=2.20, 95%CI 1.42-3.41) respectively), while the results in the factories B and D were not statistically significant. In contrast, in the both factories B and D the incidence rates of flu and other illnesses were higher than in the factory C.

Finally, none of the factories had statistically significant results (RR, 95%CI) related to the incidence rate of missing diagnoses. Overall, the highest incidence rate of diseases among white collars was in the factory C (RR=2.73(1.86-4.00), whereas the results in both B and D factories were not statistically significant.

6. DISCUSSION

The objective of this study was to examine the number of sick leave days per person years among blue and white collar workers according to the diagnoses in four factories of a food industry company in Finland during 6 years (2003-2008). We presented for the study the hypothesis that there is a difference in number of sickness absence days for each diagnosis between factories. Our hypothesis gained strong support by the results of this study.

Differences in sickness absence between countries, which are not referable to population's health, can be justified by distinctions in the sickness insurance system and employment legislation, macro-economic conjunctions, particular unemployment and also by the locality differences within a country. Nevertheless, there are differences in the sickness absence rates by localities in spite of the similar adjustments and economic situations. The locality significance as a separate defying factor of sickness absence was shown in the research related to comparison of four industrial units of the same food company: in spite of the fact that employees' health, environmental and ergonomic risk factors, also psychosocial features of the job were monitored, yet approximately 66% of locality differences in short-term sickness absence and over 90% of locality differences in long-term sickness absence stayed indefinable. The explanation of results was a demonstration of factory-determined sickness absence cultures (Virtanen, Vahtera & Nygård 2010).

Added to this, based on the earlier study of localities, the differences in sickness absence may be apparently linked to the features of the communities where the factories and workers are located (Virtanen et al. 2006). Also, the previous results of the study (Virtanen et al. 2008) in Finnish municipalities indicated that little part of sickness absence differences regarding to the communities can be justified by physical and psychosocial conditions at a work place; and reimbursement and certification demands were similar at the work places. Possible differences in the approaches among health staff giving the certificates might be ranked as individual "practitioner habitus", which as a matter of fact, has being element and piece of "worker habitus" at the community level in relation to sickness absence ((Virtanen, Vahtera & Nygård 2010).

Overall, in our study, the highest rate of sickness absence days according to the diagnoses among both blue and white collar workers was in the factory C. Moreover, our findings showed that the highest incidence rate of diseases among both occupational statuses was also in the factory C.

The study population was presented by 2780 people, out of which 1675 (60.3%) were females. The factory B had the highest number of blue and white collar workers, in comparison with the factories A, C and D.

6.1 Gastrointestinal diseases

The highest of number of sickness absence days due to gastrointestinal diseases was found in the factories B and D among blue collar workers. Also, our finding showed that significantly high rate of sickness absence among blue collar workers was due to gastrointestinal diseases. It is known that not only infections, unhealthy life style, stress, travelling over time zones, side effects of the medicines are the main causes of GI diseases, but also lower socioeconomic classes have the higher possibility of it (Alavinia et al. 2009). In publications from 1950s and later, it has been stated that peptic ulcer is more common among shift workers. Thiis-Evensen (Knutsson, Bogild 2010) classified it as “the occupational diseases of shift workers”. So, this study confirms the claims made before; and in our case, the dominance of number of sick leave days due to gastrointestinal diseases days among blue collars in the factories B and D can be explained by the higher number of shift workers (blue collar workers) in those target units than in the factories C and A.

In addition, our results showed that the number of sickness absence days due to gastrointestinal diseases among white collar workers was higher in the both factories B and D, which had more white collar workers than factories C and A.

6.2 Depression

Our finding shows that the high rates of absence days among blue collars due to depression, burnouts among blue collars were in the factories B and D, while it was more prevalent among white collars in the factory C and D.

The mental health complains are frequent among working population. They are not only one of the main reasons of impaired functioning (Druss et al. 2008), decline in productivity (Wang et al. 2004) and premature death (Mykletun et al. 2007) but also one of the main reasons of medically certified sickness absence (Lexis et al. 2012).

6.3 Flu

Due to our results, the second most common reason of sick leave among white collar workers was due to flu. The findings from the analysis presented in Table 5 showed that the number of sickness absence days due to flu in the factory B, C, D among blue collar workers were slightly different from each other. The disease is highly contagious, which affects all age groups (Knutsson, Boggild 2010) and one of the main causes of sickness and occasional death (Leighton et al. 1996).

6.4 Musculoskeletal diseases

The study found that the highest rate of sickness absence days among both occupational statuses was due to musculoskeletal diseases. The leading factory was the factory C.

Back pain is one of the most common reasons of disability among workers (de Blasio et al. 2012). The focus of most researches was on physical risk factors in physically demanding jobs, yet the previous findings stated that only 20% of back pain was the consequence of such exposures (Hemingway et al. 1997).

At the present time, musculoskeletal disorders present the largest group of occupational illnesses, and arm pain is on the second place after back pain as a cause of work-related illnesses (Hemingway et al. 1997). The prevalence rate is more among blue collar than among white collar workers with figures varying due to specific occupations; for example, 50% of computer workers in the USA feel musculoskeletal arm pain (Tornqvist et al. 2009).

Also, the study carried out among 3020 aircraft workers during 3 years found that those who ‘hardly ever’ liked their work were 2.5 times more likely to state a back injury than those who incessantly liked their jobs (Hemingway et al. 1997).

However, the effect of pain from the rest parts of body, individual factors and psychosocial work conditions on sickness absence due to MSD is not sufficiently known (Morken et al. 2003).

6.5 Pregnancy

The mean distribution of sick leave days due to pregnancy was the highest in the factory D among both blue and white collar workers. Yet, among white collars of the factory C there were not registered any cases of sickness absence due to pregnancy.

Labor markets in European countries have a large number of female workers of reproductive age. In consequence of pregnancy, woman is more exposed to environmental working factors, and work places are not arranged to the needs of pregnant women. Previous studies found the difference in sick leave among pregnant women as a result of work conditions; shift work, managerial factors and physical work load (Kristensen et al. 2008).

6.6 Injury or accident

While flu was the second common reason of sickness absence among white collars, injury or accident after musculoskeletal disease was among blue collar workers; the highest rate of sickness absence days due to injury or accident was in the factory C among blue collars as well as white collar workers in comparison with those in the factories A, B, D.

Occupational injuries are mostly preventable. Worldwide, the results of the year 2000 related to the injuries at work place stated approximately six times higher rate of occupational injuries among male workers aged 15-29 years than among female workers at the same age (Concha-Barrientos et al. 2005).

On the other hand, the findings based on the industry-specific studies found no differences of work-related injuries between genders (Mardis, Pratt 2003; Mayhew, Quinlan 2002).

Overall, we came to the conclusion and proved out hypothesis related to the locality differences in number of sickness absence days per person years due to diagnoses. Taking into the consideration the findings of the previous studies, small part of differences in sickness absence can be interpreted by physical and psychosocial working conditions. We believe that the differences in sickness absence rates between studied factories can be based on the effect of the locality features where factories and employees are situated, workers' lifestyle, how well they are informed, instructed, trained for job and aware of safety requirements; also it can be explained by health professionals' different attitudes in using medical certificates.

6.7 Strengths and limitations of the study

The strength of this study was that we used the registered data. The data was collected during 6 years from 1 January 2003 to 31 December 2008 from the personnel register of the company. The classification of diagnoses was done according to the 10th revision of the International Classification of Diseases (ICD-10). Among other sickness absence based researches in the study area our study was the first that examined the number of sickness absence days per person years among blue- and white-collar workers according to the diagnoses in four factories of a food industry in Finland.

There were also some limitations. One of the limitations of the study was that we did not have any information about the environmental/work conditions in each target unit. From our point of view, it could help us to explain the reasons of high rates of sickness absence days due to the certain diseases in the factories.

Yet, in the data there were unclassified diagnoses, which were included into the group, either missing diagnosis or other illnesses. The rate of sickness absence days due to other diagnoses among blue collars was on the second place after musculoskeletal diseases.

Next, during the statistical analyzes we only took the cases that had person years of work > 0.5.

7. CONCLUSIONS

The results gained from the present study showed there are differences in numbers of sickness absence due to diagnoses among blue and white collar workers at the four factories of a food industry in Finland during a 6-year period (2003-2008). The highest rate of sickness absence days due to diagnoses among both occupational statuses was in the factory C. Musculoskeletal diseases were the most common reason of sick leave among blue and white collar workers. Injury or accident was the second reason of sick leave among blue collars, while flu was among white collars. Based on the previous study, which monitored health of workers, environmental and ergonomic exposures, we believe that such differences in rates of sickness absences among factories might be explained by characteristics of the community where the factories and workers are located. Also, employee's life style, job qualification and knowledge of job safety can be possible determining factors to explain the rate differences and prevalence of the diseases in the factory. Possible differences in the attitudes of using medical certificates by health professionals play another important role in interpretation of our results.

The promotion of appropriate knowledge and skills of workplace safety, training, healthy life style for factory workers might reduce especially the incidence rate of injury or accident, also musculoskeletal diseases, which were more common reasons for sickness absences in our study.

8. ACKNOWLEDGMENTS

I would like to express my greatest thankfulness to the people that have helped and supported me throughout my work. I am grateful to my two supervisors, professor Clas-Håkan Nygård and docent Pekka Virtanen, for their support, encouragement and wise guidance and the researcher Dr. Subas Neupane for his patience, assistance with statistics, clear and good advice.

My special thanks to Ms.Catarina Ståhle-Nieminen for her support, motivation and unique inspiration.

I also want to thank my family, who encouraged and inspired me unconditionally during the whole period of my studies.

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